CHAPTER 2

DESCRIPTION OF THE HIWASSEE RIVER WATERSHED

2.1. BACKGROUND. The name “Hiwassee” is taken from the Cherokee word “Aye-Hawsasi”, which means “meadow along the stream.” The area is characterized by forested slopes, high gradient, clear streams, and rugged terrain. There is great aquatic habitat diversity in the watershed.

Part of the Hiwassee River is included in the State Scenic River System due to its scenic and pastoral nature. The Hiwassee was the first river managed in the State Scenic River Program. The many river outfitters along the Hiwassee River indicate its popularity among recreational boaters. Hunting and fishing are popular in the Cherokee National Forest.

This Chapter describes the location and characteristics of the Hiwassee River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Hiwassee River Watershed is located in Middle Tennessee and North Carolina. The Tennessee portion includes parts of Bradley, Hamilton, McMinn, Meigs, Monroe, and Polk Counties.

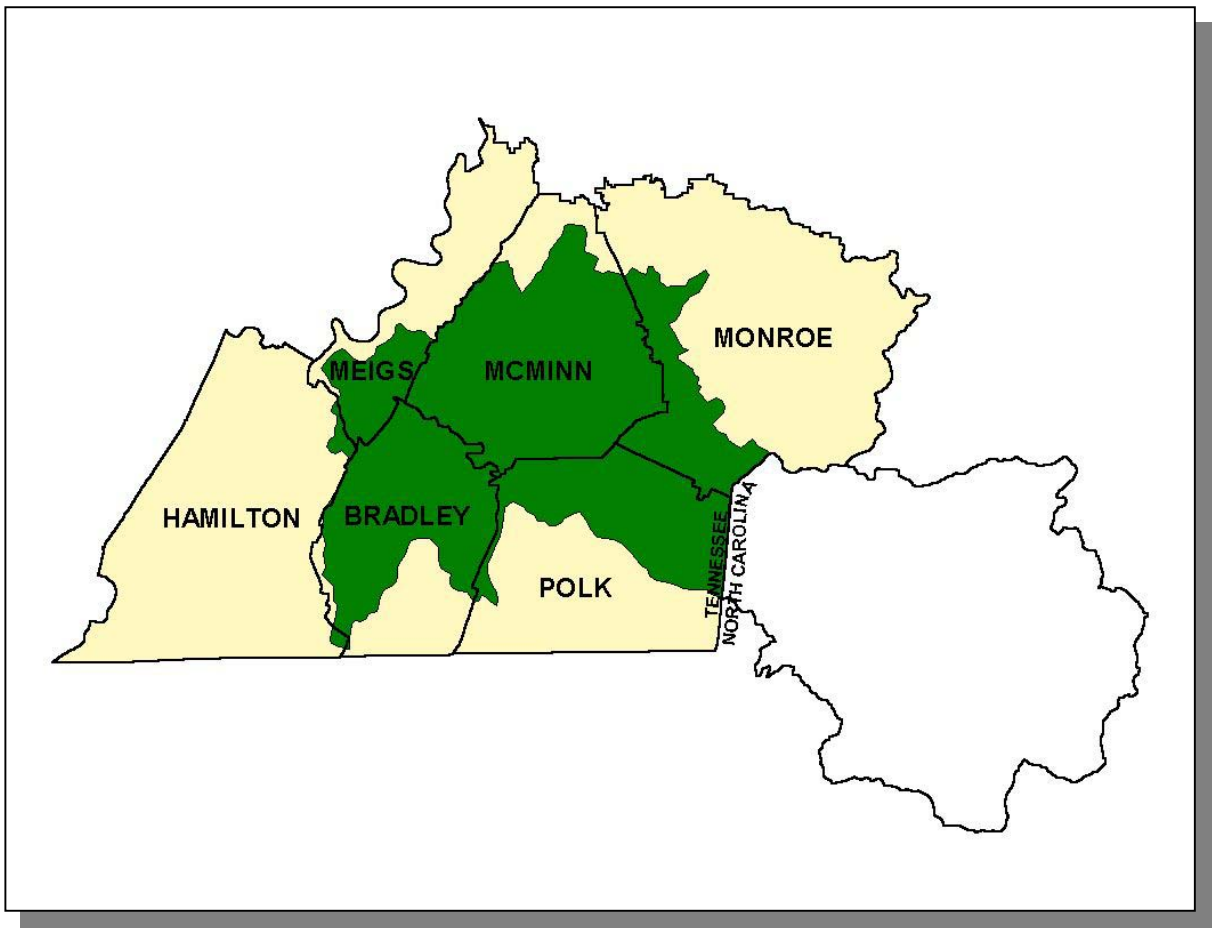

Figure 2-1. General Location of the Hiwassee River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Bradley	23.4
Hamilton	1.0
Meigs	6.7
McMinn	37.6
Monroe	12.3
Polk	19.0

Table 2-1. The Hiwassee River Watershed Includes Parts of Six Middle Tennessee Counties.

2.2.B. Population Density Centers. Eight state highways and two interstates serve the major communities in the Hiwassee River Watershed.

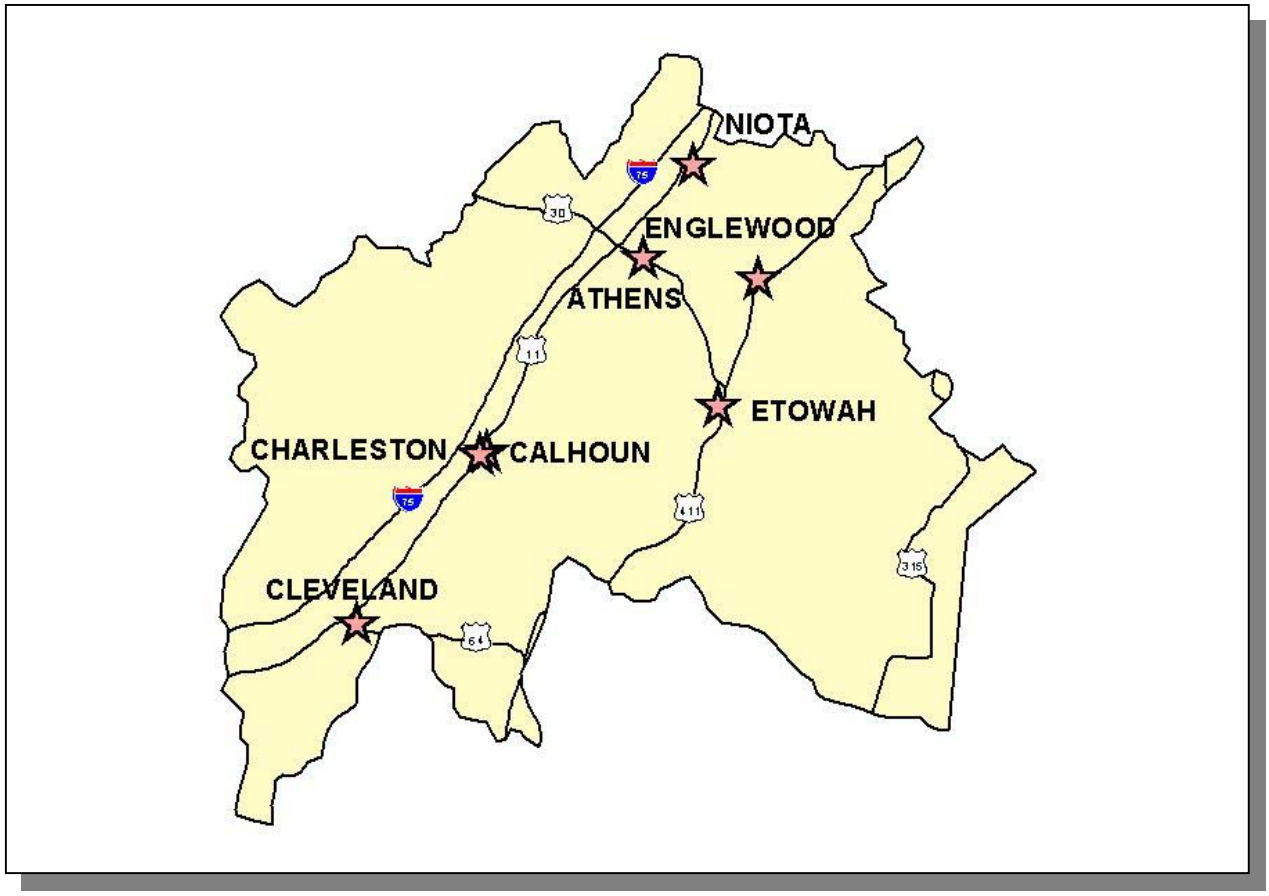

Figure 2-2. Municipalities and Roads in the Tennessee Portion of the Hiwassee River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Cleveland*	33,503	Bradley
Athens*	13,340	McMinn
Etowah	3,875	McMinn
Englewood	1,704	McMinn
Niota	795	McMinn
Charleston	648	Bradley
Calhoun	575	McMinn

Table 2-2. Municipalities in the Tennessee Portion of the Hiwassee River Watershed. *Population based on 1996 census (Tennessee Blue Book). Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Hiwassee River Watershed, designated 06020002 by the USGS, drains approximately 2,099 square miles, 1,011 square miles of which are in Tennessee, and empties to Chickamauga Reservoir (Tennessee River).

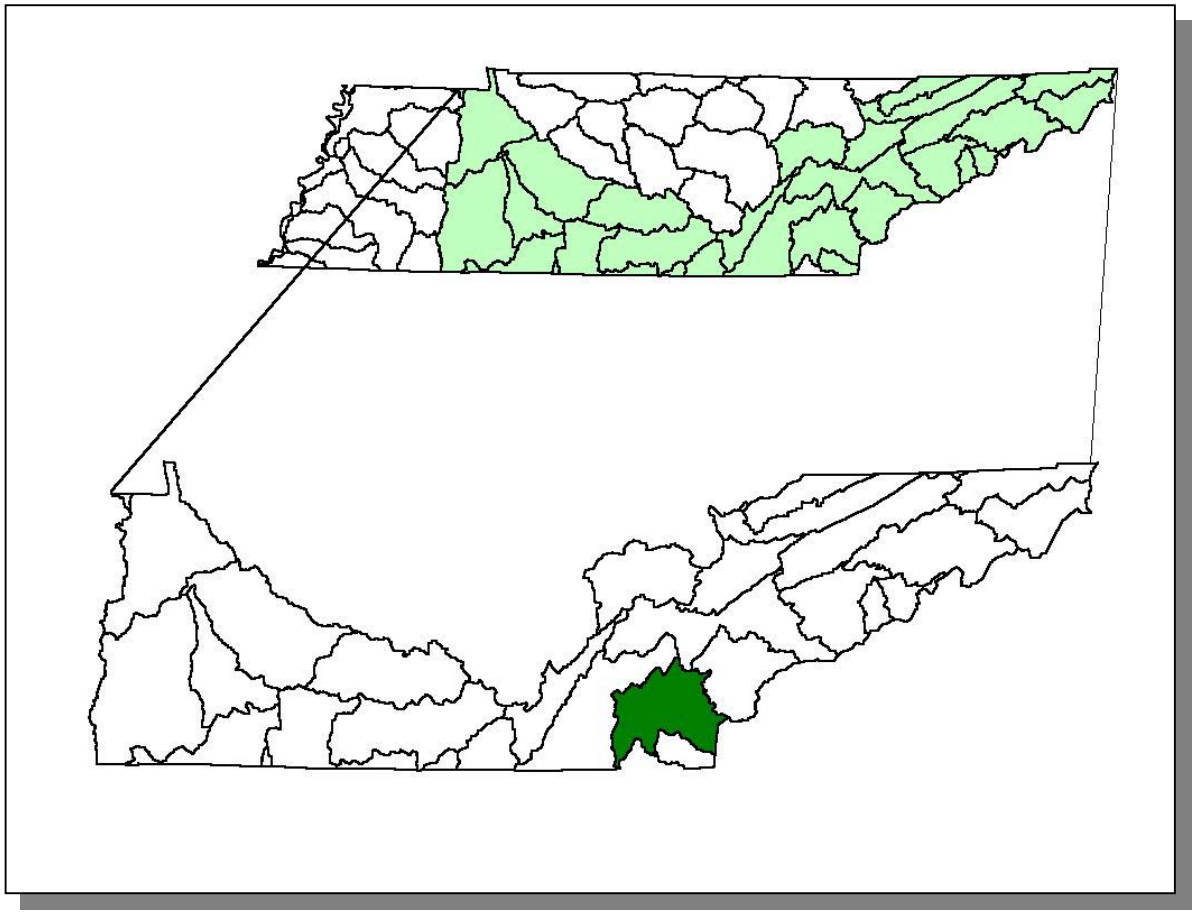

Figure 2-3. The Hiwassee River Watershed is Part of the Tennessee River Basin.

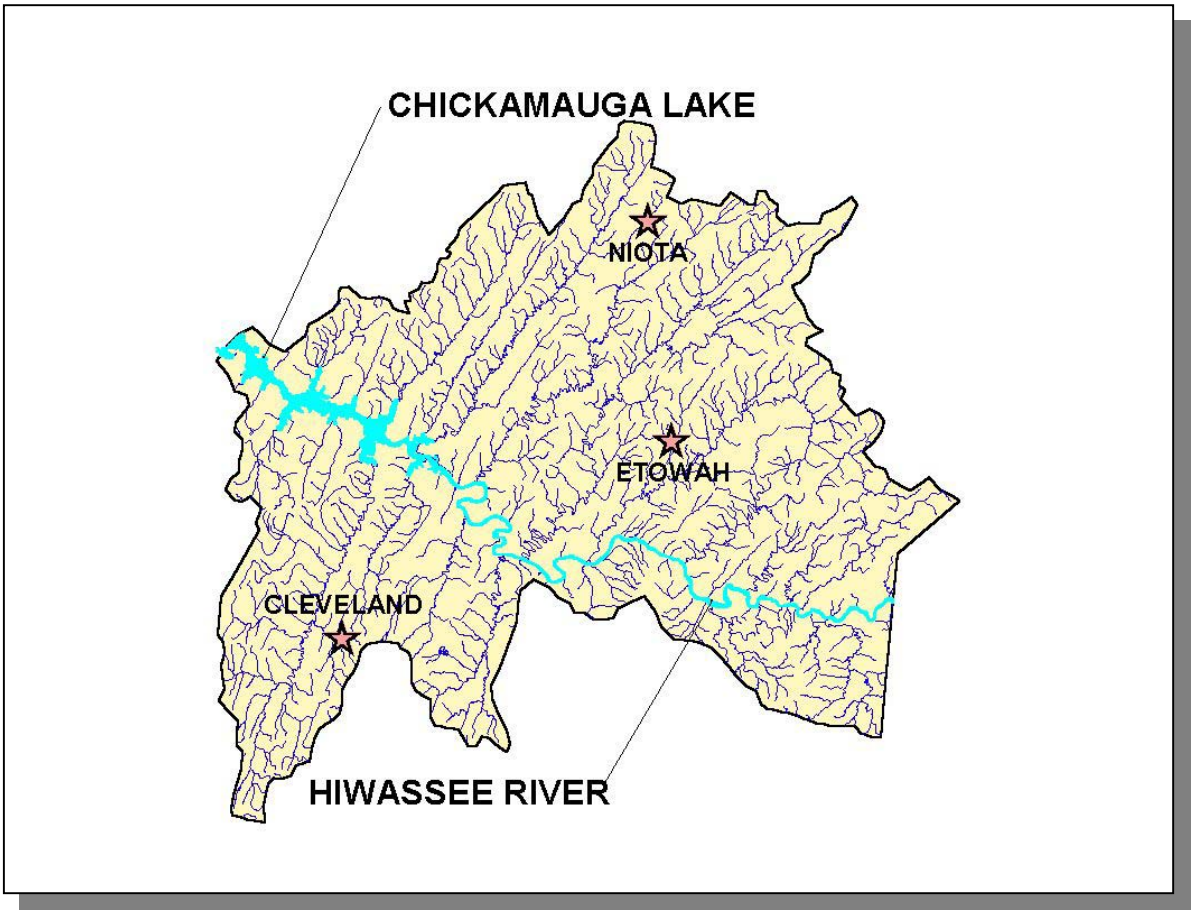

Figure 2-4. Hydrology in the Tennessee Portion of the Hiwassee River Watershed. *There are 3,113 total stream miles recorded in River Reach File 3 in the Hiwassee River Watershed. 1,657 stream miles are recorded in Tennessee. Location of the Hiwassee River, Chickamauga Lake, and the cities of Cleveland, Etowah, and Niota are shown for reference.*

2.3.B. Dams. There are 24 dams inventoried by TDEC Division of Water Supply in the Hiwassee River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

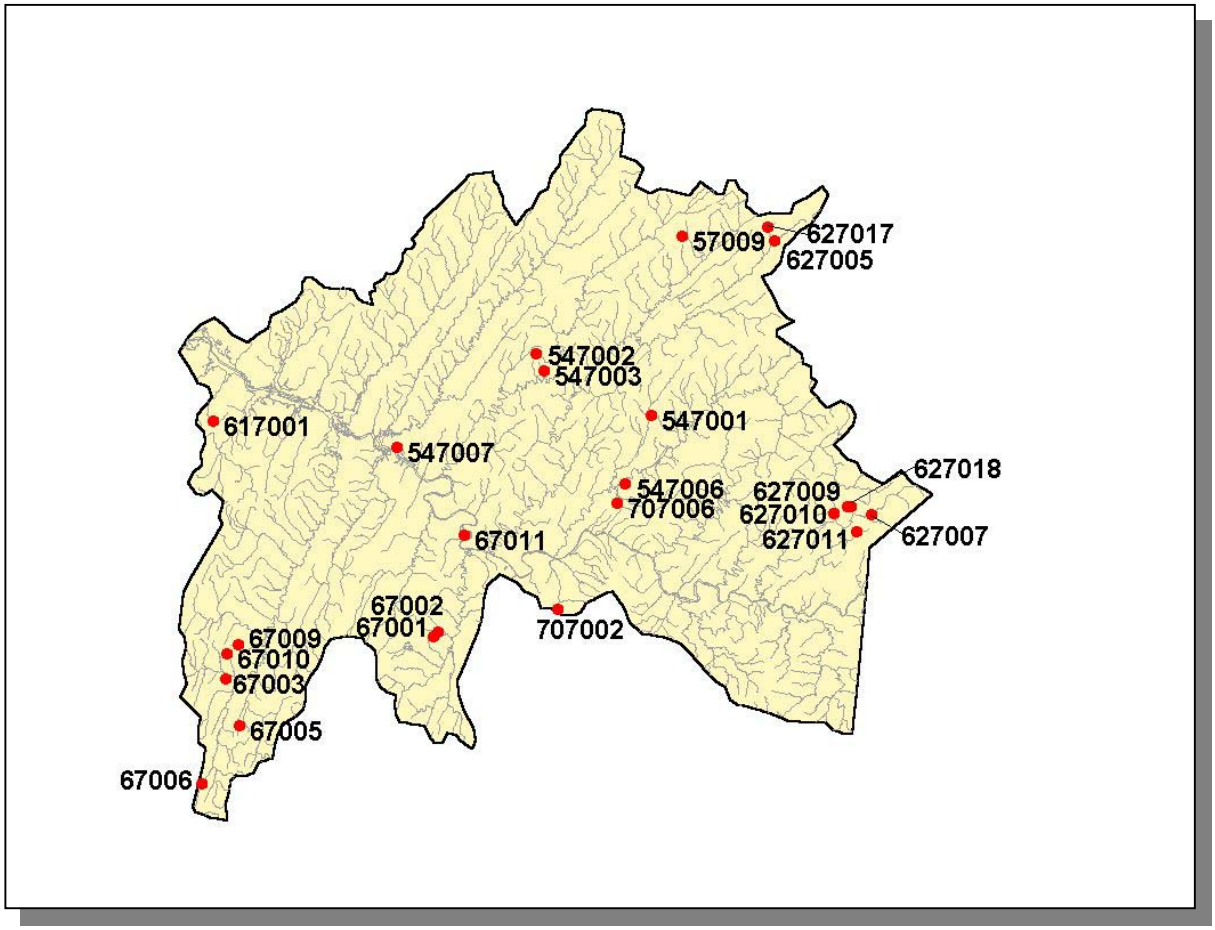

Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Hiwassee River Watershed. *More information is provided in Hiwassee-Appendix II and on the TDEC homepage at http://gwidc.gwi.memphis.edu/website/dams/viewer.htm*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

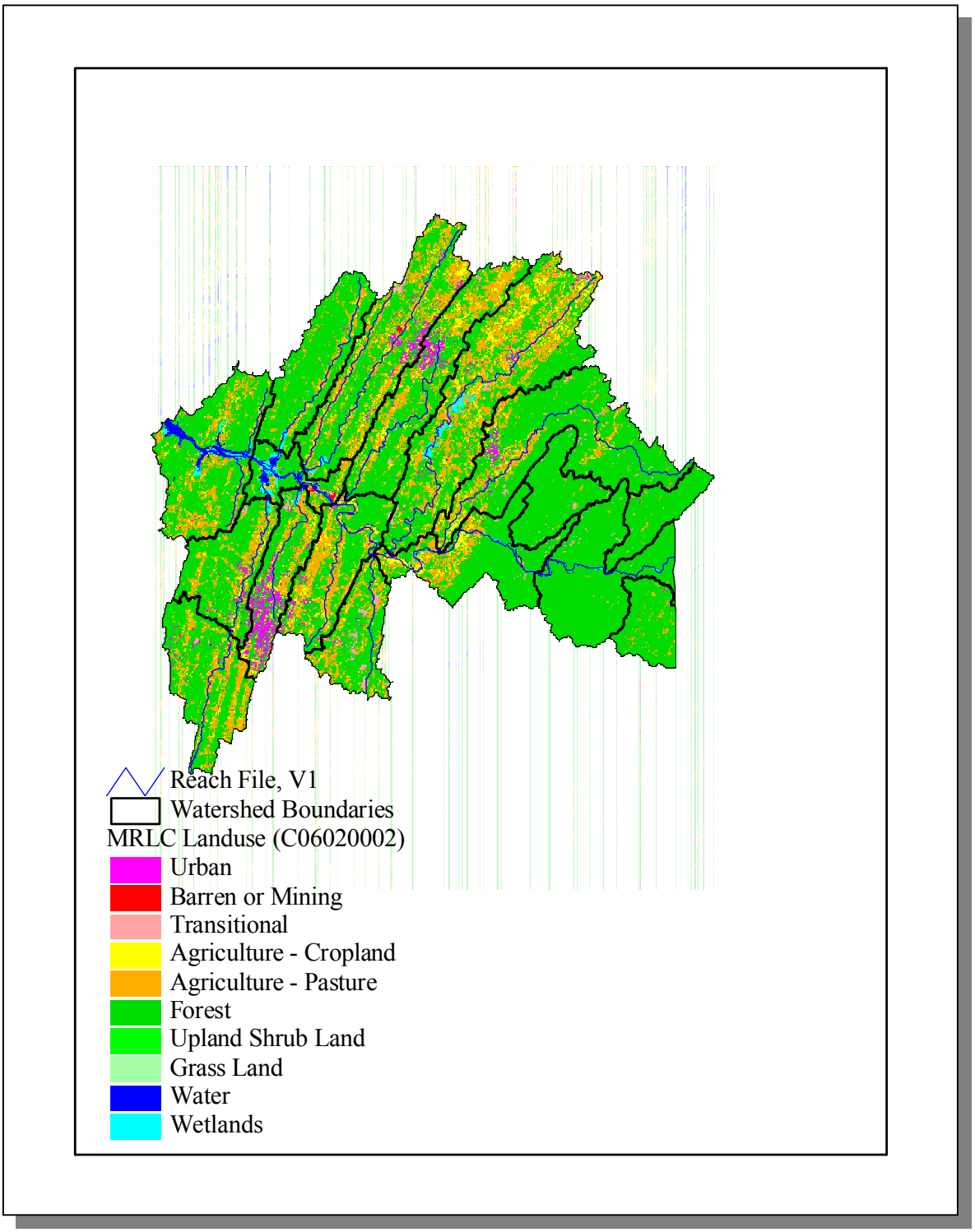

Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

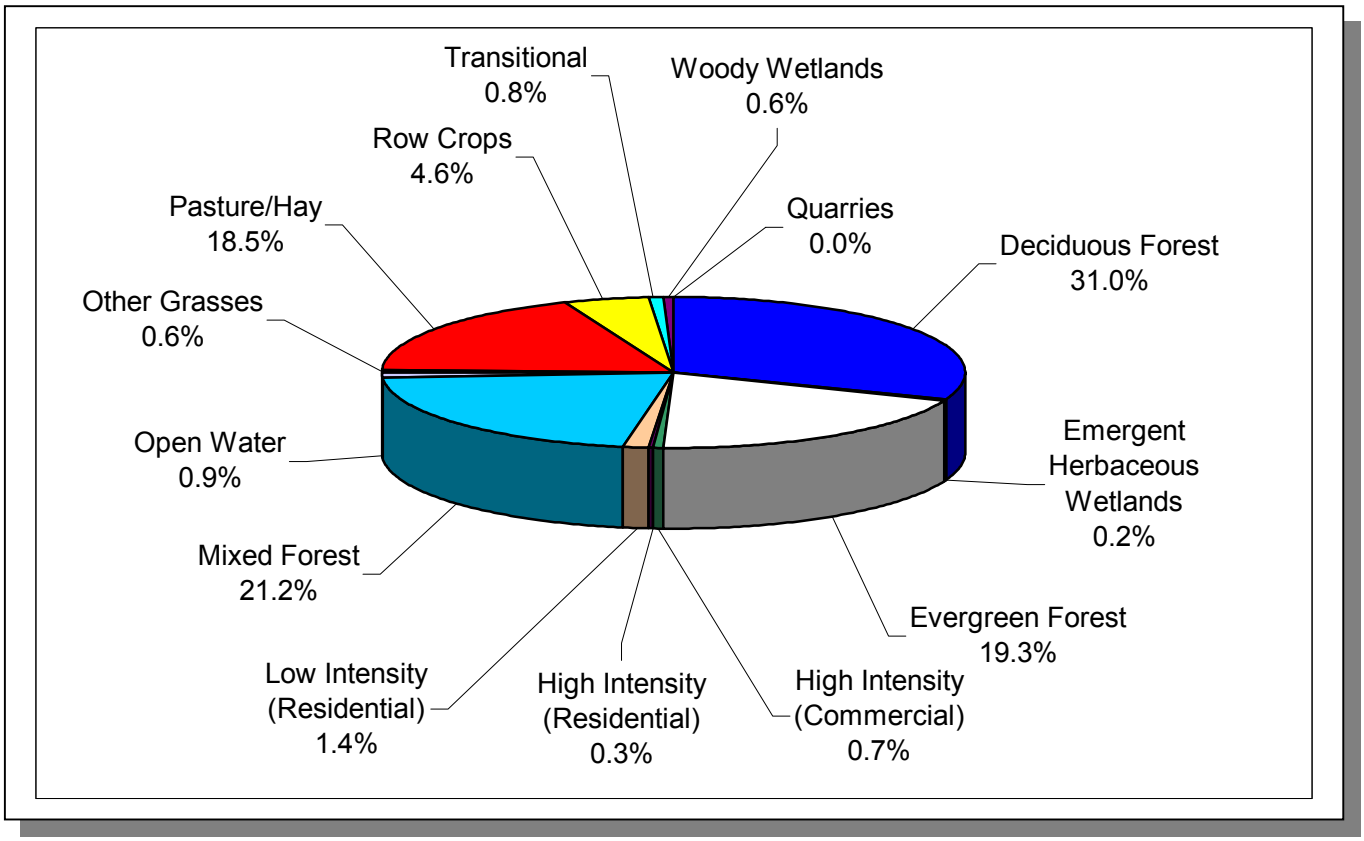

Figure 2-7. Land Use Distribution in the Tennessee Portion of the Hiwassee River Watershed. *More information is provided in Hiwassee-Appendix II.*

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Hiwassee River Watershed lies within 2 Level III ecoregions (Blue Ridge Mountains and Ridge and Valley) and contains 6 Level IV subecoregions (Griffen, Omernik, Azavedo):

- The Southern Sedimentary Ridges (66e) in Tennessee include some of the westernmost foothill areas of the Blue Ridge Mountains ecoregion, such as the Bean, Starr, Chilhowee, English, Stone, Bald, and Iron Mountain areas. Slopes are steep, and elevations are generally 1000-4500 feet. The rocks are primarily Cambrian-age sedimentary (shale, sandstone, siltstone, quartzite, conglomerate), although some lower stream reaches occur on limestone.

Soils are predominantly friable loams and fine sandy loams with variable amounts of sandstone rock fragments, and support mostly mixed oak and oak-pine forests.

- Southern Metasedimentary Mountains (66g) are steep, dissected, biologically diverse mountains that include Clingman's Dome (6643 feet), the highest point in Tennessee. The Precambrian-age metamorphic and sedimentary geologic materials are generally older and more metamorphosed than the Southern Sedimentary Ridges to the west and north. The Appalachian oak forests and, at higher elevations, the northern hardwoods forests include a variety of oaks and pines, as well as silverbell, hemlock, yellow poplar, basswood, buckeye, yellow birch, and beech. Spruce-fir forests, found generally above 5500 feet, have been affected greatly over the past twenty-five years by the balsam wooly aphid. The Copper Basin, in the southeast corner of Tennessee, was the site of copper mining and smelting from the 1850's to 1987, and once left more than fifty square miles of eroded bare earth.

- The Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f) form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the soils vary in their productivity. Landcover includes intensive agriculture, urban and industrial, or areas of thick forest. White oak forests, bottomland oak forests, and sycamore-ash-elm riparian forests are the common forest types, and grassland barrens intermixed with cedar-pine glades also occur here.

- The Southern Shale Valleys (67g) consist of lowlands, rolling valleys, and slopes and hilly areas that are dominated by shale materials. The northern areas are associated with Ordovician-age calcareous shale, and the well-drained soils are often slightly acid to neutral. In the south, the shale valleys are associated with Cambrian-age shales that contain some narrow bands of limestone, but the soils tend to be strongly acid. Small farms and rural residences subdivide the land. The steeper slopes are used for pasture or have reverted to brush and forested land, while small fields of hay, corn, tobacco, and garden crops are grown on the foot slopes and bottom land.

- The Southern Sandstone Ridges (67h) ecoregion encompasses the major sandstone ridges, but these ridges also have areas of shale and siltstone. The steep, forested ridges have narrow crests, and the soils are typically stony, sandy, and of low fertility. The chemistry of streams flowing down the ridges can vary greatly depending on the geologic material. The higher elevation ridges are in the north, including Wallen Ridge, Powell Mountain, Clinch Mountain, and Bays Mountain. White Oak Mountain in the south has some sandstone on the west side, but abundant shale and limestone as well. Grindstone Mountain, capped by the Gizzard Group sandstone, is the only remnant of Pennsylvanian-age strata in the Ridge and Valley of Tennessee.

- The Southern Dissected Ridges and Knobs (67i) contain more crenulated, broken, or hummocky ridges, compared to the smoother, more sharply pointed sandstone ridges, Although shale is common, there is a mixture and

interbedding of geologic materials. The ridges on the east side of Tennessee's Ridge and Valley tend to be associated with the Ordovician-age Sevier shale, Athens shale, and Holston and Lenoir limestones. These can include calcareous shale, limestone, siltstone, sandstone, and conglomerate. In the central and western part of the ecoregion, the shale ridges are associated with the Cambrian-age Rome Formation: shale and siltstone with beds of sandstone. Chestnut oak forests and pine forests are typical for the higher elevations of the ridges, with areas of white oak, mixed mesophytic forest, and tulip poplar on the lower slopes, knobs, and draws.

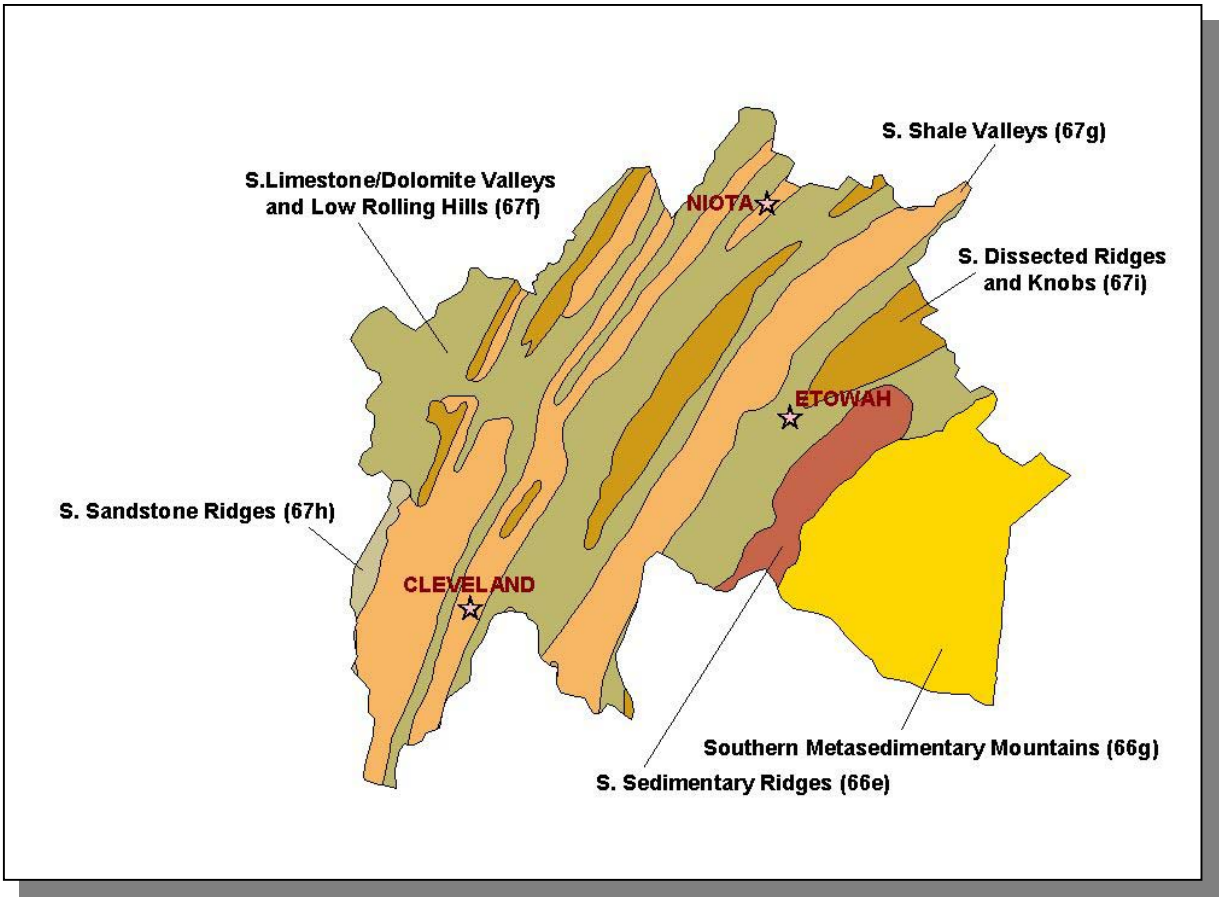

Figure 2-8. Level IV Ecoregions in the Tennessee Portion of the Hiwassee River Watershed. *Locations of Cleveland, Etowah, and Niota are shown for reference.*

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

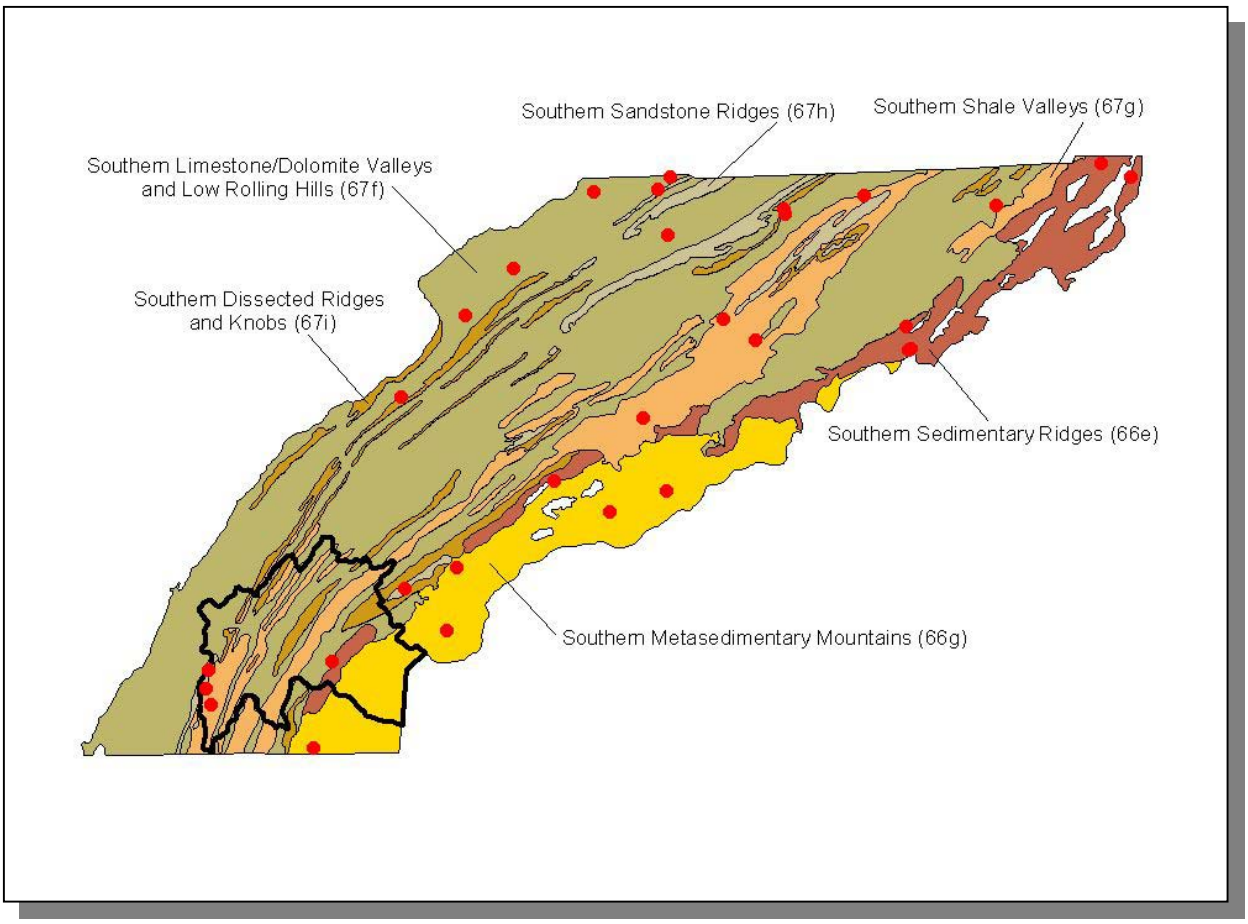

Figure 2-9. Ecoregion Monitoring Sites in Blue Ridge Mountains (66) and Ridge and Valley (67) Ecoregions in Tennessee. *The Hiwassee River Watershed is shown for reference. More information is provided in Hiwassee-Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	0
Insects	0
Mussels	3
Snails	0
Amphibians	2
Birds	1
Fish	4
Mammals	1
Reptiles	0
Plants	51
Total	**62**

Table 2-3. There are 62 Rare Plant and Animal Species in the Tennessee Portion of the Hiwassee River Watershed.

In the Tennessee Portion of the Hiwassee River Watershed, there are four rare fish species and three rare mussel species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Acipenser fluvescens	Lake sturgeon	MC	E
Percina burtoni	Blotchside darter	MC	D
Carpiodes velifer	Highfin carpsucker		D
Percina tanasi	Snail darter	LT	T
Epioblasma florentina walkeri	Tan riffleshell	LE	E
Villosa travalis	Cumberland bean	LE	E
Lexingtonia dolabelloides	Slabside pearlymussel	C	

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Hiwassee River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service, MC, Management Concern for U.S. Fish and Wildlife Service; C, Candidate species proposed for listing by the U.S. Fish and Wildlife Service . State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; T, Listed Threatened by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at* http://www.state.tn.us/environment/nh/tnanimal.html

2.6.B. Wetlands. The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

http://www.state.tn.us/environment/epo/wetlands/strategy.zip.

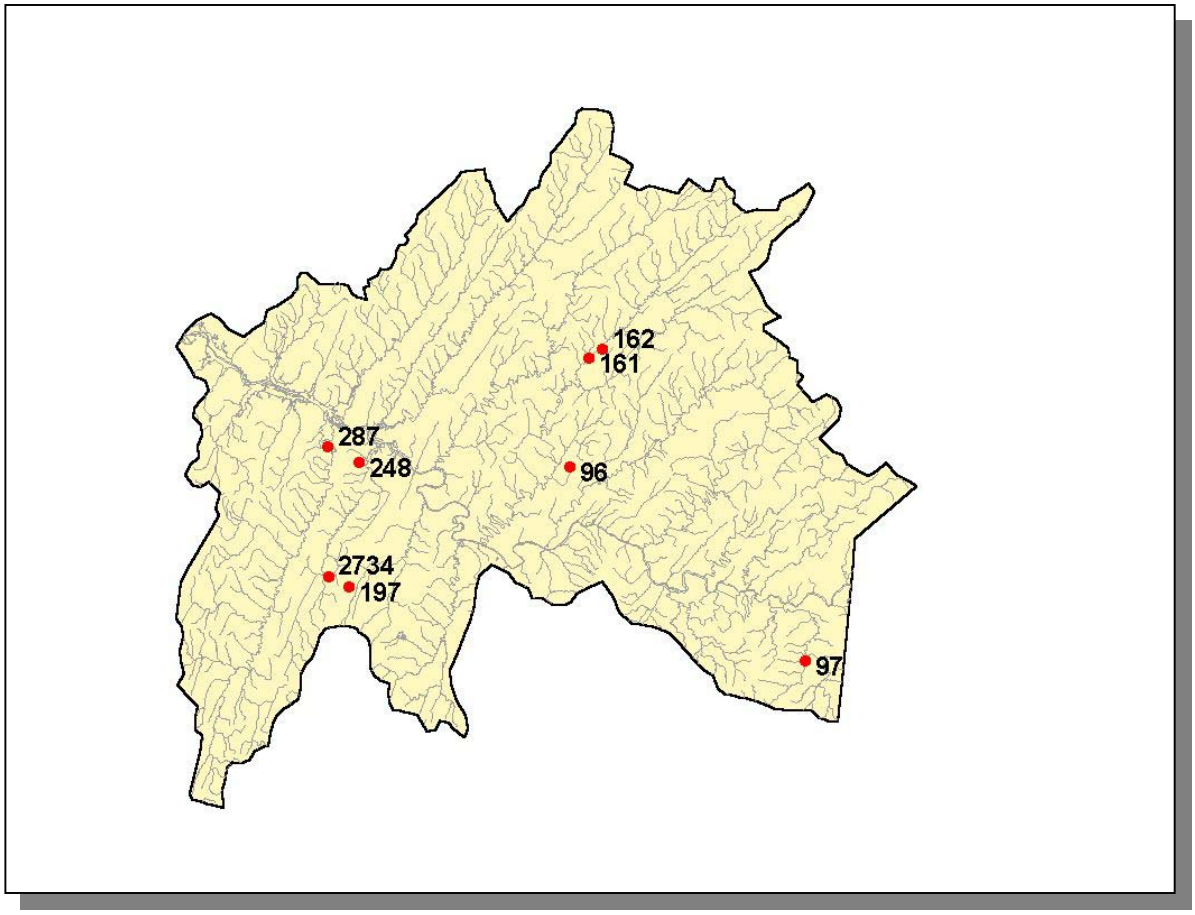

Figure 2-10. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Hiwassee River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands*. More information is provided in Hiwassee-Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. State Scenic River. A portion of the Hiwassee River has been designated as a State Scenic River. Only the segment in Polk County from U.S. 411 bridge upstream to the North Carolina-Tennessee state line. This segment of the Hiwassee River has been designated as a Class I. The Tennessee Scenic Rivers Act of 1968 defines Class I as natural river areas.

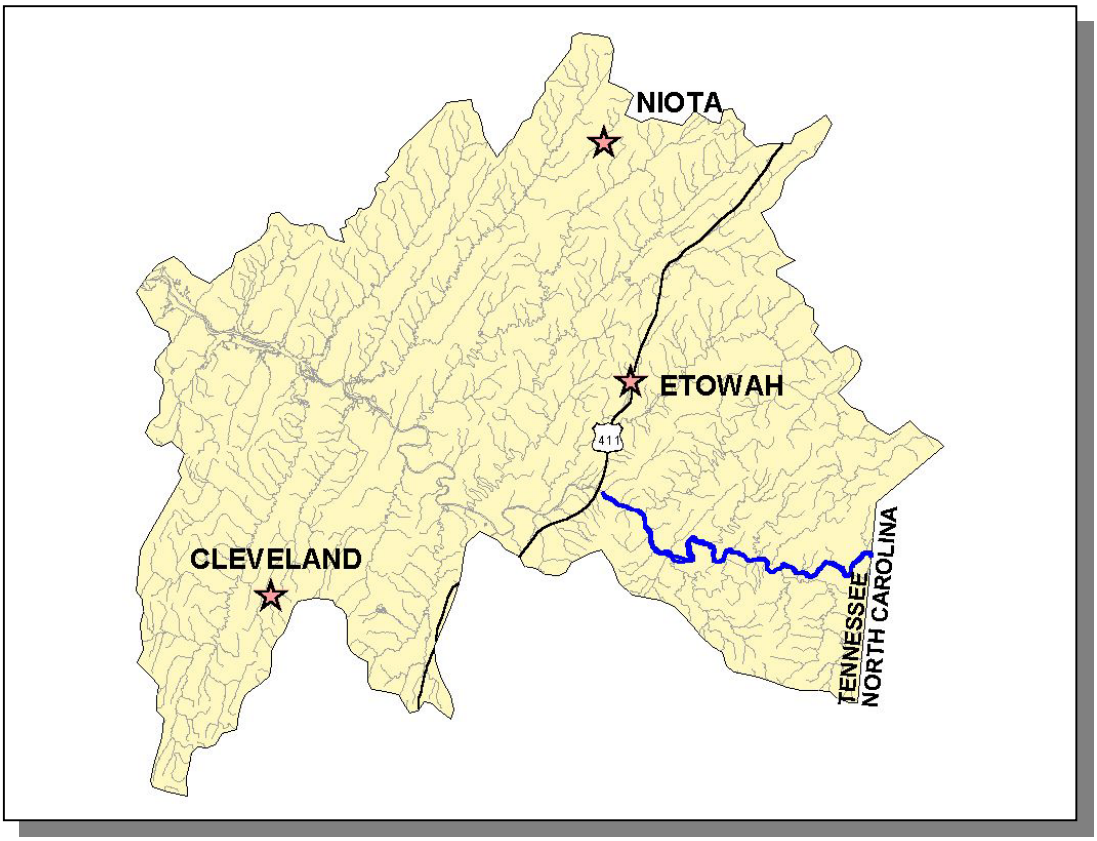

Figure 2-11. A Portion of the Hiwassee River is Designated as a State Scenic River. *Locations of Cleveland, Etowah, and Niota are shown for reference.*

2.7.B. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid

or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of two streams in the Hiwassee River Watershed:

> Hiwassee Creek, a popular scenic float stream; supports excellent game fishing; numerous rapids in beautiful mountainous setting.
>
> Hiwassee River, popular for canoeing, kayaking, rafting, and fishing in scenic mountain setting. Excellent game fishing.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Hiwassee Creek	X	X	X	X	X	X	X
Hiwassee River	X	X					

Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.

Additional information may be found online at http://www.ncrc.nps.gov/rtca/nri/tn.htm

2.7.C. Greenways. The Cleveland Downtown Historic Greenway begins in Johnson Park in the heart of Cleveland's downtown and includes 20 historic sites.

2.7.D. Interpretive Areas. Some sites representative of the cultural heritage are under state or federal protection:

- Hiwassee River State Park, includes a stretch of river and offers canoeing, rafting, fishing, hiking, and nature photography in a scenic river gorge.
- Cherokee National Forest, a vast outdoor playground with lakes, rivers, trails, and scenic drives.
- Red Clay State Historic Park, site of the last Cherokee Council before the infamous Trail of Tears, contains interpretive trails.
- Gee Creek State Park, located along the Hiwassee River, features hiking trails.

In addition, many local interpretive areas are common, most notably, the historic farming community of Reliance.

2.7.E. Wildlife Management Area. The Tennessee Wildlife Resources Agency manages eight wildlife management areas in the Hiwassee Watershed and jointly manages the Cherokee National Forest with U.S. Forest Service.

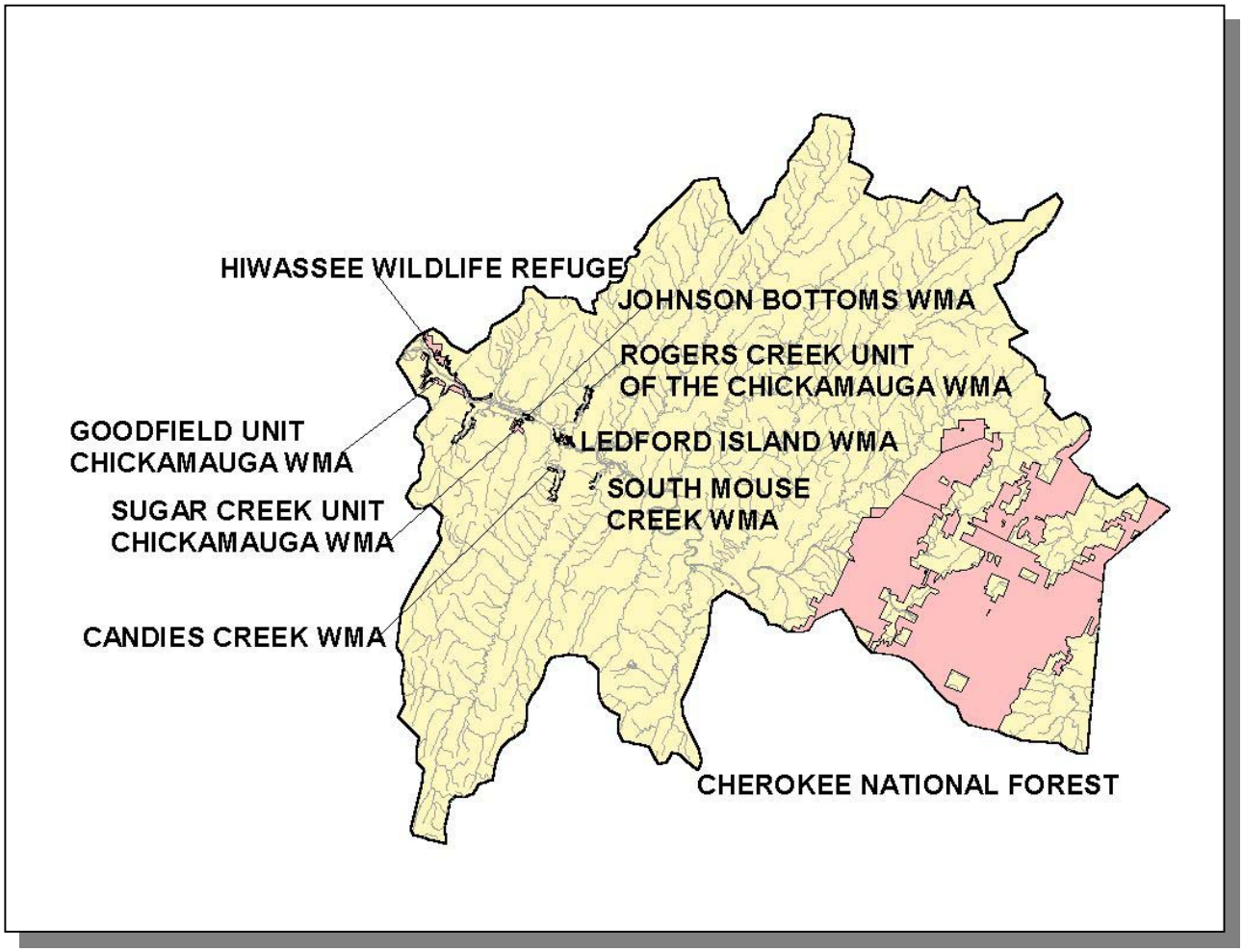

Figure 2-13. TWRA Manages Wildlife Management Areas in the Hiwassee River Watershed.

2.8. Tennessee Rivers Assessment Project. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

http://www.state.tn.us/environment/wpc/publications/riv/

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Agency Creek	2		3	Lick Creek			2
Big Lost Creek	1	2	1	North Mouse Creek	3	2	
Bullett Creek	2		3	Oostanaula Creek	3	3	
Candies Creek	2	2		Price Creek	2		
Chatata Creek	2	3	2	Rogers Creek	3	3	
Chestuee Creek	3	3		South Chestuee Creek	2	3	
Childers Creek		1		South Mouse Creek	4	3	
Coker Creek	2		1	Spring Creek (Eastern)	3	3	
Conasauga Creek	3	3	1	Spring Creek (Western)	2		3
Coppinger Creek	4			Sugar Creek	3		
Gunstocker Creek	3	1,2	2	Towee Creek	2		3
Hiwassee River	2,3		1,3	Turtletown Creek			1

Table 2-6. Stream Scoring from the Tennessee Rivers Assessment Project.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed